Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A Maximum likelihood sequence estimator (MLSE) for estimating a sequence of transmitted symbols received over a dispersive communication channel, wherein a trellis of states and trellis paths are associated with the possible transmitted symbol sequence, said MLSE comprising:

a plurality of data sources relating respectively to state transition probabilities and observed values of received data symbols;

means for calculating and storing the likelihood metric and survivor bit for each state of the trellis using values from said data sources, comprising means for computing branch metrics for the trellis by setting a first portion of the branch metrics equal to a coefficient which models an autocorrelation of an impulse response of a channel and setting a second portion of the branch metrics equal to a sum or difference of a prior value of a branch metric and a coefficient which models an autocorrelation of an impulse response of a channel;

means for determination of the final state on the maximum likelihood path in the trellis; and

means for calculating the maximum likelihood sequence of transmitted symbols in a backward trace through the trellis using said stored survivor bits.

2. (Currently Amended) The ~~system~~ MLSE of claim 1 further comprising means for computing supporting branch metric parameter calculations wherein branch metric parameters are computed recursively for a Gray coded sequence of states, wherein said recursive computation requires only a single addition operation per branch metric parameter per state, thereby substantially reducing the number of computational steps required per branch metric parameter calculation.

3. (Original) The MLSE of Claim 2 wherein said branch metric parameters are pre-computed and stored in data memory prior to forward trace through the trellis, said stored branch metric parameters retrieved from memory as needed to support state metric calculations subsequently performed in forward trace through the trellis.

4. (Original) The MLSE of Claim 2 wherein said branch metric parameters are computed in real time as needed for state metric calculations, and wherein the sequencing of the states is according to a Gray code for both branch metric calculations and state metric calculations, thereby achieving a substantial savings in data storage requirement.

5. (Previously Presented) The MLSE of Claim 1 further including means to utilize prior knowledge about the initial trellis state to enhance MLSE estimation performance of said transmitted sequence, said performance enhancing means including:

initial state register paired with initial state mask register wherein a pair of registers define a set of valid initial states representing prior knowledge about the transmitted sequence; and

means for initialization of trellis state metrics such that the MLSE Viterbi algorithm selection of the maximum likelihood path in the trellis is confined only to paths having a valid initial state.

6. (Previously Presented) A Maximum likelihood sequence estimator (MLSE) for estimating a sequence of transmitted symbols received over a dispersive communication channel, wherein a trellis of states and trellis paths are associated with the possible transmitted symbol sequence, said MLSE comprising:

a plurality of data sources relating respectively to state transition probabilities and observed values of received data symbols;

means for calculating and storing the likelihood metric and survivor bit for each state of the trellis using values from said data sources;

means for determination of the final state on the maximum likelihood path in the trellis;

means for calculating the maximum likelihood sequence of transmitted symbols in a backward trace through the trellis using said stored survivor bits; and

means to utilize prior knowledge about the initial trellis to enhance MLSE estimation performance of said transmitted sequence, said performance enhancing means including:

final state register paired with final state mask register wherein said register pair define a set of valid final states representing prior knowledge about the transmitted sequence; and

means for selection of the final state of the trellis on the maximum likelihood path such that the MLSE Viterbi algorithm selection of the maximum likelihood path in the trellis is confined only to paths having a valid final state.

7. (Previously Presented) The MLSE of Claim 2 further including means to provide sufficient data for a class of soft decision generators that are dependent only on partial path metrics.

8. (Previously Presented) A method of computing a maximum likelihood sequence estimate comprising:
providing an initial state;

providing an initial state mask comprising a plurality of bits having either a first polarity or a second plurality; and

determining a plurality of valid initial states by:

starting with the initial state; and

substituting a don't care for each bit in the initial state which has a corresponding bit having a first state in the initial state mask,

wherein the valid initial states are defined by either a one or a zero in the bit position having a don't care, and the same bit as the initial state in the other positions.

9. (Original) The method of claim 8 wherein the initial state mask is determined by a power up characteristic of a transmitter.

10. (Original) The method of claim 9 wherein the transmitter is compliant with the Global System for Mobile standard.

11. (Previously Presented) A method of computing a maximum likelihood sequence estimate comprising:

providing a trellis comprising a plurality of nodes corresponding to a plurality of states at a plurality of stages; and

computing branch metrics for the trellis by setting a first portion of the branch metrics equal to a coefficient which models an autocorrelation of an impulse response of a channel and setting a second portion of the branch metrics equal to a sum or difference of a prior value of a branch metric and a coefficient which models an autocorrelation of an impulse response of a channel.

12. (Previously Presented) The method of claim 11 wherein a present state is incremented to a next state by changing only one bit in accordance with a Gray code.

13. (Previously Presented) The MLSE of Claim 6 comprising a comparator configured to test for equality of an output of the final state register and a current state in accordance with an output of the final state mask register.

14. (Previously Presented) The MLSE of Claim 13 comprising a multiplexer for selecting the current state or a prior state in accordance with the test.

15. (Previously Presented) The MLSE of Claim 14 comprising a latch for storing the current state in accordance with the test.

16. (Previously Presented) The MLSE of Claim 6 comprising means to utilize prior knowledge about the initial trellis state to enhance MLSE estimation performance of said transmitted sequence, said performance enhancing means comprising:

initial state register paired with initial state mask register wherein a pair of registers define a set of valid initial states representing prior knowledge about the transmitted sequence; and

means for initialization of trellis state metrics such that the MLSE Viterbi algorithm selection of the maximum likelihood

path in the trellis is confined only to paths having a valid initial state.

17. (Previously Presented) The method of claim 8 comprising testing for equality of the initial state and a current state in accordance with the initial state mask.

18. (Previously Presented) The method of claim 17 comprising controlling a multiplexer in accordance with the testing to select an initial metric value associated with a valid initial state or an initial metric value associated with an invalid initial state.

19. (Previously Presented) The method of claim 8 comprising associating initial metric values with the valid initial states and invalid initial states, wherein the initial metric values associated with the valid initial states are greater in magnitude than the initial metric values associated with the invalid initial states.

20. (Previously Presented) The method of claim 19 wherein the initial metric values associated with the invalid initial states are negative values.

21. (Previously Presented) The method of claim 8 comprising:

providing final state data;

providing a final state mask;

determining a plurality of valid final states in accordance with the final state data and the final state mask; and

selecting path matrices corresponding to a valid initial state and a valid final state.

22. (New) A maximum likelihood sequence estimator for estimating a sequence of transmitted symbols received over a communication channel, wherein a trellis of states and paths are associated with a possible transmitted symbol sequence, the maximum likelihood sequence estimator comprising:

a plurality of data sources relating respectively to state transition probabilities and observed values of received data symbols;

a circuit adapted to generate and store a likelihood metric and a survivor bit for each state of the trellis using data from the data sources, the circuit adapted to sequence at least a portion of the states of the trellis in accordance with at least one Gray code sequence;

a circuit adapted to determine a final state on a maximum likelihood path in the trellis; and

a circuit adapted to calculate a maximum likelihood sequence of transmitted symbols in a backward trace through the trellis using the stored survivor bits.

23. (New) The maximum likelihood sequence estimator of claim 22 wherein state values are generated in accordance with the at least one Grey code sequence.

24. (New) The maximum likelihood sequence estimator of claim 22 wherein:

the at least a portion of the states of the trellis comprises all of the states of a stage of the trellis; and

the at least one Gray code sequence is one Gray code sequence.

25. (New) The maximum likelihood sequence estimator of claim 22 wherein computing supporting branch metric parameters requires only a single addition operation per branch metric parameter per state.

26. (New) A method of computing a maximum likelihood sequence estimate comprising:

defining a trellis comprising a plurality of nodes corresponding to a plurality of states at a plurality of stages;

generating and storing a likelihood metric and a survivor bit for each state of the trellis, comprising sequencing through at least a portion of the states of each stage in accordance with at least one Gray code sequence;

determining a final state on a maximum likelihood path in the trellis; and

calculating a maximum likelihood sequence of transmitted symbols in a backward trace through the trellis using the stored survivor bits.

27. (New) The method of claim 26 wherein a present state is incremented to a next state by changing only one bit in accordance with the at least one Gray code sequence.

28. (New) The method of claim 26 wherein state values are generated in accordance with the at least one Grey code sequence.

29. (New) The method of claim 26 wherein:

the at least a portion of the states comprises all of the states of a stage of the trellis; and

the at least one Gray code sequence is one Gray code sequence.

30. (New) The method of claim 26 wherein computing supporting branch metric parameters requires only a single addition operation per branch metric parameter per state.